# CHAPTER III

# Research Method

Chapter three provides a discussion conducting with this research. The description involves the research design, the population, the sample and sampling technique, research hypothesis, data collection, research instrument, and data analysis. Those details information will be explained in the following section.

## 3.1 Research Design

Research design in education is directed at developing, testing, implementing, and diffusing innovative practices to move the socially constructed forms of teaching and learning (Kelly, Lesh, and Baek, 2008:3). In line with this Henn, Weinstein, and Foard (2006:46) states that research design in education deals with aim, purposes, intention and plans within the practical constrains of location, time, and availability of research. Therefore, in this research design researchers will explain about the kind of research.

Some of the most commonly used research methodologies in education are experimental research, co-relational research, causal-comparative research, survey research, ethnographic research, historical research, and action research (Fraenkel, 2009:21). Each types of educational research have specific characteristics according to the type of data that will be investigated by researchers. In line with this Fraenkel (2009) states, research methodologies described constitutes a different way of inquiring into reality and have different tool for understanding education problems.

Individual research methodologies can be classified into general research types. Descriptive studies describe a given state of affairs. Associational studies investigate relationships. Intervention studies assess the effects of a treatment of method on outcomes. Meanwhile, quantitative and qualitative research methodologies are based on different assumptions. Those methodologies are difference on the purpose of research, the methods used by researchers, the kinds of studies undertaken, the researcher's role, and the degree to which generalization is possible (Fraenkel, 2009:21).

According to the type of data based on the topic which is taken by the researcher, this study includes quantitative research. Quantitative research is explaining phenomena by collecting numerical data that are analyzed mathematically in particular statistics (Muijs, 2004:1). Meanwhile, quantitative research divides into several research types. Those types of quantitative research are group-comparison experimental research, single-subject experimental research, co-relational research, causal-comparative research, and survey research (Frankel, 2009:259). Based on characteristics of the data the type of this research is experimental research design of group-comparison.

Design study of this experimental research is Two Group Post Test Only design. This designs divide into two groups namely the experimental group received special treatment by using learning to read using the CIRC and the control group who carry out conventional learning. At the end of the study, both groups were given post-test (final test) to find out the results of the study (Jannah, 2012: 162).

The study design is illustrated in table form by Sugiyono (2009:12) as follows:

Table 3.1 Research Model Experiments by Sugiyono

| Group | Treatment | Post Test |
|---|---|---|
| E | X (CIRC) | $O_1$ |
| C | - | $O_2$ |

E = experimental group

C = control group

X = treatment (kinds of teaching method will be used by researcher)

$O_1$ = the result of post-test from experimental group

$O_2$ = the result post-test from control group

Independent variable : the use of circ method

Dependent variable : reading skill of class X students at SMKM 2 Dinoyo, Malang.

## 3.2 Population, Sample, and Sampling Technique

### 3.2.1 Population

Population is the generalization region consisting of the subject or object that has certain qualities and characteristics defined by the researcher to learn and then drawn conclusions. Based on that description, the population of this research are the students of SMK Muhammadiyah 2 Dinoyo, Malang.

### 3.2.2 Sample

The sample is part of the number and characteristics possessed by the population. From analyzing the sample of the researcher can take the conclusion

will be applied to the population. The researcher will take 2 class from 10th grade which are in each class have 40 students to represent the impact of CIRC implementation.

### 3.2.3 Sampling Technique

Sampling technique is how the researcher took the sample from population. Researchers will take probability sampling with simple random sampling technique. In simple random sampling of members of the sample and the population carried out randomly without depend on strata that exist in the population.

## 3.3 Research Hypothesis

The hypothesis is a temporary answer to the formulation of research problems, formulation of research problems which have been expressed in the form of a question sentence. It is said to be temporary, because new answers given are based on relevant theory, not based on empirical facts obtained through data collection. So, the hypothesis can also be expressed as a theoretical answer to the formula research problem, not the answer to the empirical data.

In this research the researcher used a statistical hypothesis, which means research based on a sample taken from the population. In this hypothesis, there are two types of hypothesis that the null hypothesis and the alternative hypothesis. The null hypothesis or null hypothesis means that in this study there was no significant difference in post-test performed after the treatment applied. Whereas the alternative hypothesis states that the post-test data is contained significant

effects after treatment in the study sample. The formula of that hypothesis can be written as

$H_0: \mu\, control = \mu\, experiment$

$H_a: \mu\, control \neq \mu\, experiment$

### 3.4 Research Instrument

In principle of research are performing measurements, in which the measurement required a measuring instrument. The measurement in which used to research called an instrument of research. Thus, the research instrument is an instrument used in a research to measure the natural and social phenomena to be observed. In this research, researcher used the instrument of research Two Group Post Test only.

### 3.5 Data Collection

The data collection gathered with these steps:

1. The researcher observed the class.
2. The researcher prepared and makes lesson plan.
3. The researcher selected the instrument to get the good data.
4. Researchers conducted a pre test reading to the students to determine learning group reading. Pre-test is needed because the group CIRC not selected randomly but based on the students' best value. These steps is required to create group of CIRC based the students' reading achievement value of the test.
5. Researcher will conduct two experiments different teaching reading skills in the experimental class and control class.

6. Researcher conducted a post test results of the teaching of reading in the control group and the control group to determine the impact of the use of CIRC and the impact of learning to read conventional teaching methods.

### 3.6 Data Analysis

#### 3.6.1 Instrument Technique Analysis

**1. Validity Test**

Validity is the most important consideration in developing and evaluating measuring instruments. Validity was defined as the extent to which instrument measured what it claimed to measure. The focus of recent views of validity is not on the instrument itself but on the interpretation and meaning of the scores derived from the instrument (Ary, 2010:225).

The researcher will be used Pearson product moment to analyze the instrument validity. In line with this, Sugiyono (2010:225) states Pearson product moment could be used to analyze the regression to know the correlation between two groups in post test only research design. This is the formula of Pearson product moment:

$$r_{xy} = \frac{n \sum x_i y_i - (\sum x_i)(\sum y_i)}{\sqrt{\{n \sum x_i^2 - (\sum x_i)^2\} \left\{n \sum y_i^2 - (\sum y_i)^2\right\}}}$$

Where,

$r_{xy}$ : Correlation index

$\sum x$ : sum of scores in X distribution

$\sum y$ : sum of scores in Y distribution

$\sum x^2$ : sum of the squared scores in X distribution

$\sum y^2$ : sum of the squared scores in Y distribution

$n$ : number of paired X and Y scores (subjects)

**2. Reliability Test**

The formula which is used to test the reliability of research instrument Kuder-Richardson Procedures (Ary, 2010: 245). The following formula is:

$$r_{xx} = \frac{k}{k-1}\left(\frac{s_x^2 - \sum pq}{s_x^2}\right)$$

Where,

$r_{xx}$ : reliability of the whole test

$k$ : number of items on the test

$s_x^2$ : variance of scores on the total test (squared standard deviation)

$p$ : proportion of correct responses on a single item

$q$ : proportion of incorrect responses on the same item

**3. Estimating Level of Difficulty Reading Test**

Measuring the level of difficulty is used to determine the level of difficulty of test question that will be done by the students. Formula measuring the level of difficulty is as follows:

$IF = \frac{B}{JS}$ (Brown, 2004:59)

Where,

$IF$ : Item of difficulty

$B$ : Number of test-takers answering of item incorrectly

$JS$ : Number of test-takers answering of item correctly

In order to analyze the level of difficulty requires next formula to know the standard difficulty level of English reading text. This formula is

$P = \frac{Mean}{Maximum\ score}$ (Salwa, 2012:33)

Where,

$P$ : Level of difficulty of essay test or short answer test.

$Mean$ : Average of students' score.

$Maximum\ score$ : The maximum score of each essay item.

There are criteria of level difficulty of essay

$P = 0{,}00$ : Test items is too difficult

$0{,}00 < P \leq 0{,}30$ : Test items is difficult

$0{,}30 < P \leq 0{,}70$ : Test items is medium

$0{,}70 < P \leq 1{,}00$ : Test items is easy

$P = 1{,}00$ : Test items is too easy

**4. Estimating Difference Level of Research Instrument**

The different level capacity test will describe the difference level of whole test items. Thus, the validity of test question could be used to differentiate students' level achievement begin from low level, medium, and high level of students' understanding about the lesson.

The measuring difference of essay capacity test is

$D = \frac{B_A}{J_A} - \frac{B_B}{J_B}$

Where,

$D$ : Items of differentiate capacity level of test

$B_A$ : Number of top test takers that have correct answer

$B_B$ : Number of bottom test takers that have correct answer

$J_A$ : Total participant of top test takers

$J_B$ : Total participant of bottom test takers

The measures of standard value of the test will be showed as follow:

$$D = \frac{Mean\ A - Mean\ B}{Maximum\ Score}$$

Where,

$D$ : Differentiation capacity level of test

$Mean\ A$ : The average of students' score on the top group

$Mean\ B$ : The average of students' score on the bottom group

$Maximum\ score$ : The maximum score of each test item

Classification of differentiation the test capacity

$D = 0{,}00 - 0{,}20$ : Poor differentiation capacity

$D = 0{,}20 - 0{,}40$ : Sufficient differentiation capacity

$D = 0{,}40 - 0{,}70$ : Good differentiation capacity

$D = 0{,}70 - 1{,}00$ : Very good differentiation capacity

$D = negative$ : Score should be skipped

### 3.6.2 Data Technique Analysis

**1. Normality Test**

Normality test is used to determine whether the data have normal distribution or not. The Researcher used Lilliefors test to assess the normality distribution. In line with this, Marques (2007:187) states the Lilliefors test is tailored to assess the normality of a distribution, with null hypothesis formalized as:

$$H_o : F\,(x) = N_{\mu,\sigma}(x)$$

Where,

$H_o$ : null hypothesis

$F\,(x)$ : probability distribution of x

$N_{\mu,\sigma}$ : normal distribution with mean $\mu$ and standard deviation $\sigma$

For this purposes, the test standardizes the data using the sample estimates of $\mu$ and $\sigma$. The Lilliefors' test statistic is:

$$D_n = \max|F\,(Z) - S_n(Z)|$$

Where,

$D_n$ : Lilliefors deviation

$F\,(Z)$ : probability distribution

$S_n(Z)$ : small deviation of $F\,(Z)$

According from that formula, Z represented the standardized data (Marques, 2007:187).

**2. Homogeneity Test**

The technique used in the homogeneity test is the test of Fisher formula:

$$F = \frac{S_1^2}{S_2^2}$$

With, $S^2 = \frac{N\sum fx^2 - (\sum fx)^2}{(n-1)}$

Where,

$F$ : homogeneity

$S_1^2$ : variance 1

$S_2^2$ : variance 2

$n$ : sum sample

$f$ : frequency

$x$ : data

If $F_{density} < F_{table}$ , then $H_o$ have difference variance for each sample

If $F_{density} \geq F_{table}$ , then $H_o$ have the same variance for each sample

**3. Independent t-test**

The formulation data analysis is using of t-test. The t test for independent samples is a straightforward ratio that divides the observed difference between the means by the difference expected through chance alone (Ary, 2010:171). The t-test formalized as:

$$t \frac{\bar{X}_1 - \bar{X}_2}{S_{\bar{x}_1 - \bar{x}_2}}$$

With,

$$S_{\bar{x}_1 - \bar{x}_2} = \sqrt{\frac{\sum x_1^2 + \sum x_2^2}{n_1 + n_2 - 2}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}$$

Where,

$S_{\bar{x}_1 - \bar{x}_2}$ : standard error of the difference between two means

$n_1$ : number of cases in group 1

$n_2$ : number of cases in group 2

$\sum x_1^2$ : sum of squared deviation scores in group 1

$\sum x_2^2$ : sum of squared deviation scores in group 2

In chapter three, researcher has already introduced the study consist of research design, population, sample, sampling technique, research hypothesis,

research instrument, data collection, and data analysis. Next review of finding and discussion of this research will be presented in chapter IV.